MOSQUITO NOTES.—III.

By F. W. Edwards.

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Contents :

A.—On a Collection of Mosquitos from Paraguay.

The collection here described was sent for determination by Dr. K. Kertész to Mr. F. V. Theobald in 1911, and was passed on to the writer by Mr. Theobald in 1921. Most of the specimens were collected by Fiebrig, and these unfortunately bear no exact data. A few (including the type of *Janthinosoma paraguayensis*) were collected by Vezênyi, mostly at Asuncion in 1904. Though not large, the collection contains a high percentage of apparently undescribed forms, which are dealt with below. The holotypes of two of the new species are in the collection of the Budapest Museum, but in those cases where the species has been described from a number of cotypes, the material has been divided between the Budapest Museum and the British Museum. Since little seems to have been recorded concerning the mosquitos of Paraguay, I give first a list of all the species included in the collection.

Megarhinus portoricensis, v. Röder.
Sabethes schausi, D. & K.
Wyeomyia (*Phoniomyia*) *fuscipes*, sp. n.
Psorophora (*Psorophora*) *ciliata*, Fab. (? *tibialis*, R.-D. ; ? *lynchi*, Brèthes).
,, ,, *pallescens*, sp. n. (*ciliata*, Arr.).
,, (*Janthinosoma*) *posticata*, Wied.
,, ,, *fiebrigi*, sp. n.
,, ,, *discrucians*, Walk. (*paraguayensis*, Strick.).
,, ,, *purpurascens*, sp. n.
,, (*Grabhamia*) *confinnis*, Arr.
,, ,, *varinervis*, sp. n.
Aëdes (*Ochlerotatus*) *stigmaticus*, sp. n.
,, ,, *albofasciatus*, Macq.
,, ,, *scapularis*, Rond.
,, ,, *serratus*, Theo.
Taeniorhynchus (*Taeniorhynchus*) *titillans*, Walk.
,, ,, *fasciolatus*, Arr.
Aëdomyia squamipennis, Arr.
Culex coronator, Theo.
,, *fatigans*, Wied.
Anopheles tarsimaculatus, Goeldi.

Wyeomyia (Phoniomyia) fuscipes, sp. n.

♀. *Head* with metallic violet scales dorsally ; sides silvery below ; a line of golden scales at the junction of the violet and silver areas. Eyes separated by nearly the width of two ommatidia. Clypeus dull, dark brown. Tori black, with a strong grey pollinosity. Proboscis dark, slender, longer than the long front femora. Palpi dark, about one-seventh as long as the proboscis. *Thorax* with shining blackish-brown integument ; scales of prothoracic lobes violet ; of mesonotum metallic bronzy ; of scutellum, pro-epimera and subspiracular area golden ; of remainder of pleurae silvery. Two or three small spiracular bristles. *Abdomen* blackish dorsally, pale golden laterally and beneath, the line of junction of the colours rather deeply incised, the black wedges situated at the apices of the tergites. Tergites 4–7 each with a small median basal whitish spot. *Legs* dark ; undersides of femora, tibiae, and first tarsal segments lighter ; no white markings on any of the tarsi. *Wings* with dark brown scales, the outstanding ones ligulate. Upper fork-cell nearly three times as long as its stem, its base nearer the base of the wing than is that of the lower fork-cell. Wing-length, 3 mm.

Cotypes, 2 ♀ (*Fiebrig*). No exact data.

This species is probably related to *W. trinidadensis*, Theo., differing in the entire absence of white on the tarsi and in other particulars. I think that *Phoniomyia* can be recognised as a good subgenus on the character of the proboscis, but whether its recent division by Bonne-Wepster & Bonne into *Phoniomyia*, *Dodecamyia* and *Dyarina* can be maintained seems open to serious question.

Psorophora (Psorophora) ciliata, Fab.

Some of the examples in the collection (all are females) seem to me to be indistinguishable from the North American species. They have the scales on the pre-scutellar space mostly flat and white, with a narrow area of golden ones in the middle. Some others may perhaps represent a distinct species (? *tibialis*, R.-D.) ; in these the pre-scutellar scales are all narrow and golden.

Psorophora (Psorophora) pallescens, sp. n.

Head clothed with pale buff-coloured flat scales. Proboscis and palpi mainly pale-scaled, some dark ones intermixed. Palpi of ♀ nearly one-half as long as the proboscis, of ♂ longer than the proboscis by nearly the length of the last two joints, which are upturned and swollen. Clypeus light brown. *Thorax* with the integument light brown, mesonotum largely blackish. In the centre of the mesonotum is a longitudinal row of narrow, curved, golden scales, bordered on each side by a row of broad, flat, pale buff scales ; external to this is a pair of narrow, bare, blackish stripes ; the remainder of the mesonotum covered with broad, pale buff scales, except for a pair of short and rather broad bare black stripes, widely separated, just in front of the scutellum, and a pair of small rounded spots of deep black scales in the middle. Postnotum light brown. Mesonotal bristles numerous, short, blackish. Pleurae with dense broad buff scales ; bristles pale ; pro-epimeral bristles very small and weak ; about three moderately long spiraculars ; numerous lower mesepimerals. *Abdomen* uniformly clothed with pale buff scales ; integument light. Male hypopygium practically as figured and described by Howard, Dyar and Knab for *Ps. ciliata*, Fab. Claspers with two sharp projecting points some little way before the tip. Tenth tergite with numerous short bristles ; tenth sternite with the tips cleft into three teeth. Lobes of ninth tergite each with about ten fine bristles. *Legs* pale ochreous ; tips of femora, and the whole of the tibiae and first two tarsal joints of the hind legs with long outstanding scales ; scales mostly pale, but with numerous dark ones intermixed. All joints of hind tarsi broadly white-ringed at the base.

Femora and tibiae of ♂ with long dense hair, much longer than the scales. *Wings* with mixed light and dark scales, the former preponderating on the costa and on most of the veins. Fork-cells about half as long again as their stems, their bases about level. Cross-veins closely approximated (actually in a line in one specimen). Wing-length, 6·5 mm.

Cotypes, 1 ♂, 4 ♀ (*Fiebrig*).

This is obviously the species described and figured by Arribalzaga as *Ps. ciliata*. Since, however, the present species does not appear to occur in North America, whence *Ps. ciliata* was described, it is likely that Arribalzaga's determination was incorrect. The thoracic ornamentation is very different in the two species, though the hypopygial structure shows that they are very closely allied. No specimens of *Ps. pallescens* have previously been received at the British Museum, nor apparently have any specimens been recorded apart from Arribalzaga's.

Psorophora (Janthinosoma) fiebrigi, sp. n.

Head with the integument mostly orange, becoming browner towards the front ; clypeus blackish ; scales orange ; bristles blackish. Palpi purple-scaled ; in ♀ about one-quarter as long as the proboscis ; in ♂ slender, longer than the proboscis by nearly the length of the last two joints. Proboscis slender, about equalling the front femora, with appressed purplish scales. *Thorax* with the integument shining black. Mesonotum and pro-epimera with small flat bronzy scales, none lighter at sides. Scutellum similarly scaled. Bristles black. Pleurae (except pro-epimera and the bare area behind them) densely clothed with silvery-grey scales, without the least tinge of ochreous ; bristles pale ; two or three spiraculars ; no lower mesepimeral. *Abdomen* purple-scaled dorsally, except for the first segment and the apical corners of the remaining segment, which are golden. Venter mostly golden, with narrow purple bands at the bases of the segments. Male claspers greatly expanded in the middle, and with a moderately long, slender, hooked tip ; the expanded portion with a patch of short recurved bristles on the outer side. Stem of claspettes long and rather stout, suddenly bent almost at right angles a little beyond the middle, tip very slightly expanded ; outer two filaments short and flattened, the outer one simple, the second distorted. *Legs* purple-scaled ; hind femora golden at the base beneath ; fourth hind tarsal segment white on the basal three-fifths to four-fifths, tip dark ; last hind tarsal segment white beneath except at the tip, upper surface more or less darkened, more so in ♀ than in ♂. Tibiae and first two tarsal segments of hind legs with the scales raised, but not very long. *Wing* scales dark. Fork-cells with their bases level, about one-third longer than their stems. Wing-length 4 mm.

Cotypes, 5 ♂, 4 ♀ (*Fiebrig*).

Apparently most nearly allied to *Ps. posticata*, but smaller and with differently marked hind tarsi, rather shorter scales on hind legs, and differently formed claspettes.

Psorophora (Janthinosoma) purpurascens, sp. n.

♀. *Head* dark, with dark upright scales and scattered small silvery-grey scales. Palpi and proboscis with appressed purplish scales ; palpi about one-fifth as long as the proboscis. Clypeus shining dark brown. *Thorax* with the integument black, somewhat shining. Mesonotum and scutellum with flat silvery-grey scales, darker, but not conspicuously so, in the centre of the mesonotum. Pro-epimera practically bare. Pleurae with dense flat silvery-grey scales. Mesonotal and most of pleural bristles blackish. Two or three small pale spiracular bristles ; mesepimeral bristles also pale ; about five lower mesepimerals present. *Abdomen* purplish dorsally,

each segment with a complete golden-yellow band ; the bands are apical at the sides of the segments, but in the middle are removed from the margin, which bears a small patch of purple-scales. Venter golden, the sternites narrowly purple at the base. *Legs* purple-scaled ; undersides of femora golden ; undersides of front and mid tarsi light brownish ; hind tarsi without any white ; hind tibiae stout but the scales scarcely raised, much shorter than the dense setae. *Wing* scales linear, all dark brown. Wing-length 4 mm.

Type, 1 ♀ (*Fiebrig*). No exact data.

Nearly allied to the North American *Ps. cyanescens*, Coq., but differing in the abdominal markings.

Psorophora (Grabhamia) varinervis, sp. n.

♀. *Head* with dark upright scales, and small golden-brown narrow curved scales. Eyes separated by the width of two ommatidia. Clypeus, tori, and first few flagellar segments ochreous-brown, remainder of antennae blackish. Proboscis ochreous-scaled, darker at the tip, slender, longer than front femora. Palpi ochreous-scaled, rather stout, scarcely one-fifth as long as the proboscis. *Thorax* with the integument dull chestnut-brown ; mesonotum with four darker stripes, the lateral pair abbreviated. Mesonotal scales minute, strongly curved, golden brown, those on and in front of the scutellum somewhat larger. Scales of prothoracic lobes, pro-epimera and post-spiracular area similar to those of the mesonotum ; those on mesepisternum and mesepimeron larger and paler. A posterior row of five pro-epimeral bristles ; three or four spiraculars ; about six post-spiraculars ; no lower mesepimeral. *Abdomen* with pale integument ; much denuded, but all the remaining scales are ochreous. *Legs* pale ; scales mainly ochreous, but numerous scattered dark ones are present on the femora, and the tips of the tarsal segments are dark ; scales at the bases of the last few tarsal segments almost white. There is no indication of a white ring in the middle of the first hind tarsal segment. Claws simple. *Wings* with the scales mainly ochreous, but with many scattered black ones ; costa entirely pale ; on the other hand, black scales preponderate at the tip of R_1, on R_4+_5, M_2, and the stem and branches of Cu ; at the base of R_4+_5 (third vein) the black scales are aggregated into a rather definite spot. Outstanding scales linear. Fork-cells nearly half as long again as their stems, base of upper one slightly nearer apex of wing. Cross-veins widely separated. Wing-length, 4 mm.

Type, 1 ♀ (*Fiebrig*). No exact data.

A very distinct species with no close ally. The coloration is rather suggestive of the Canadian *Aëdes* (*Ochlerotatus*) *spenceri*, but the presence of spiracular bristles and the simple claws show that the insect is a *Psorophora* of the subgenus *Grabhamia*. The small size of the mesonotal scales is noteworthy.

Aëdes (Ochlerotatus) stigmaticus, sp. n.

♀. *Head* yellow, clothed with golden-yellow mixed upright forked and narrow curved scales. Proboscis slender, longer than the front femora, black-scaled except at the base, where the scales are golden-yellow. Palpi scarcely a quarter as long as the proboscis, yellow-scaled, the tips black. Antennae with the tori and first flagellar segments yellow, the rest blackish. *Thorax* with the integument mainly yellow. On the front margin are four dark brown marks ; a pair of short stripes close together in the middle of the mesonotum, and a roundish spot on the upper anterior corner of each pro-epimeron. Above and just in front of each wing-root is a large oval black spot. Pleurae without dark markings, except for those on the pro-epimera.

Mesonotum with light brown bristles and rather scanty golden-yellow scales. Pleurae without scales ; four pro-epimeral bristles ; about six post-spiraculars ; no lower mesepimeral. *Abdomen* yellowish, much denuded, the remaining scales golden-yellow. Seventh segment slender ; eighth retracted ; cerci apparently rather short. *Legs* with yellow integument ; femora with golden-yellow scales, except at the tips, which are black ; tibiae darker ; tarsi blackish, without definite rings (but much rubbed). *Wings* with the scales mostly dark brown ; costa and first vein yellow-scaled on the basal third only, the colour gradually shading to brown ; scales narrow. Fork-cells about as long as their stems, base of upper slightly nearer the apex of the wing than that of lower. Wing-length, 5 mm.

Cotypes, 2 ♀ ; one from Asuncion, 1904 (*Vezènyi*), the other without data (*Fiebrig*).

The species is nearly allied to *A. fulvus* (Wied.), and *A. bimaculatus* (Coq.), differing from both in the shorter palpi and mainly dark-scaled wings, and from the former in the absence of a black band across the pleurae.

B.—New and little-known Sabethines collected by Mr. G. E. Bodkin in British Guiana.

Included in collections which have been received from Mr. G. E. Bodkin during the past year are a number of interesting species of mosquitos, notes on which are appended. Many species of *Wyeomyia* were sent, and in the course of determining these I noticed some interesting peculiarities in the middle tarsi of the males, which seem to give much needed assistance in the discrimination of nearly allied species. These characters have not heretofore been described accurately, and I have therefore figured some of them. The types of the two new species, and most of the other specimens referred to, have been presented to the British Museum through the Imperial Bureau of Entomology.

Goeldia longipes, Fab.

2 ♀, Issororo, ix.1921 ; attacking man ; diurnal.

These are the first specimens of this rare and beautiful species which have been received at the British Museum.

Sabethoides imperfectus, B.-W. & B.

1 ♀, Ulauna, Kariabo, Aruka River, ix.1921 ; attacking man ; diurnal.

A ready means of distinction from *S. nitidus* is found in the upper mesepimeral bristles. In *S. nitidus* these are of the ordinary length, but in the specimen of *S. imperfectus* before me they are extremely long, curving over the base of the postnotum and almost meeting in the middle line.

Wyeomyia splendida, B.-W. & B.

1 ♂, 1 ♀, Rockstone, 29.vii.1921, bred from larvae inhabiting Bromelias ; 1 ♂, Aruka River, 16.ix.21, bred from larva in Bromelia ; 1 ♀, Issororo, ix.21, bred from larva in *Heliconia*.

The fourth mid-tarsal segment of the ♂ (fig. 1, *s*) has a single long, slender spine at its tip ; the fifth segment is about two and a half times as long as its average breadth, with a large rounded prominence in the middle beneath, the prominence

bearing a dense tuft of short scales (appearing like spines in the dry specimen). Claws both strongly chitinised and equal in length, but one much broader than the other.

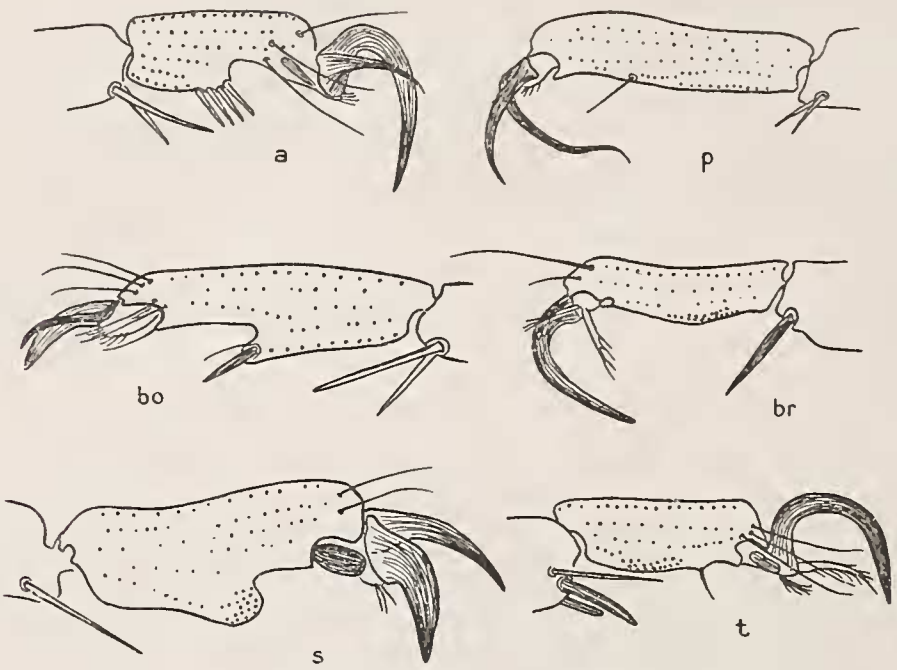

Fig. 1. Last tarsal segment of mid legs of ♂♂ of *Wyeomyia*; scales omitted, their bases represented by dots: (*a*) *W. aphobema*, Dyar; (*bo*) *W. bodkini*, sp. n.; (*br*) *W. bromeliarum*, D. & K.; (*p*) *W. pseudopecten*, D. & K.; (*s*) *W. splendida*, B.-W. & B.; (*t*) *W. telestica*, D. & K.; all × 200.

Wyeomyia pseudopecten, D. & K.

A series from Issororo, bred from larvae in Heliconias.

The last segment of the mid tarsi of the ♂ (fig. 1, *p*) is simple, nearly cylindrical, about four times as long as broad with moderately dense scales on the basal half of the underside, and a fine bristle rather beyond the middle. Its claws are both strongly chitinised and rather large, one longer and much more curved than the other, with a long fine sinuous point.

Wyeomyia bromeliarum, D. & K.

A long series from Georgetown, reared from larvae in bamboo stumps, also 1 ♀ labelled as having been reared from bromelias; conceivably there may have been an error in labelling this specimen, the species being reputed to be restricted to bamboos.

The fourth mid-tarsal segment of the ♂ (fig. 1, *br*) bears a single strong spine at its tip. The fifth segment is slightly enlarged beneath and bears a dense scale-tuft just before the middle. One claw is large, sickle-shaped and strongly chitinised; the other is apparently represented by a much shorter, thin, pale and slightly hairy structure resembling an empodium.

Wyeomyia telestica, D. & K.

A series from Issororo, bred from larvae in leaf-bases of pineapple plants and bromelias.

The fourth mid-tarsal segment of the ♂ (fig. 1, *t*) has one thin spine and two shorter thick ones at its tip. The fifth segment resembles that of *W. bromeliarum*, but is

shorter and the chitinised claw is curved more into a semicircle. The ♂ claspers carry a long and excessively fine hair at the tip of one of the lobes, which is omitted from Howard, Dyar and Knab's figure.

Wyeomyia bodkini, sp. n.

♂. *Head* clothed with blackish scales, which have a rather distinct blue reflection when viewed from in front ; white scales low down at the sides, but no trace of a white eye-margin. Eyes very narrowly separated, but distinctly so above the antennae, though at the vertex they are practically touching, the line between them greyish, without scales. Tori and clypeus bare, blackish, with a rather pronounced pale grey dusting. Tips of flagellar segments narrowly white ; the last segment a little longer than the others. Proboscis black, of the same length as the abdomen, slightly but distinctly swollen at the tip. Palpi thin, black, about as long as the clypeus. *Thorax* : prothoracic lobes rather large, not very widely separated, clothed mainly with brilliant blue scales, passing to coppery below, and with a few white scales on the lower margin. Pro-epimera densely clothed with silvery scales. Mesonotum black, densely covered with flat black scales, larger posteriorly.

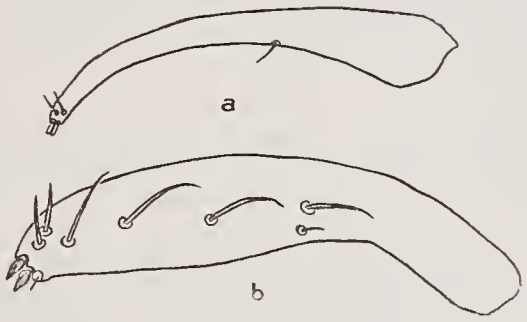

Fig. 2. Male claspers of *Wyeomyia* : (*a*) *W. aphobema*, Dyar ; (*b*) *W. bodkini*, sp. n.

Postnotum dark brown, with four long dark bristles, no scales. Pleurae densely clothed with silvery scales. Two spiracular bristles ; no pro-epimerals. *Abdomen* black above, shining white at the sides and beneath, the colours separated in a straight line. *Hypopygium* : lobes of ninth tergite each with five stout and rather short bristles. Side-pieces with a row of about eight strong bristles in the middle of the inner face, and with a slight subapical lobe bearing one rather long bristle and one or two fine hairs. Clasper simple, slightly swollen on its apical two-thirds, with several long, curved hairs and two short terminal claws. Tenth sternites with a vertical row of four terminal points. *Legs* blue-black. Front tarsi with a white line beneath on the last three segments. Mid tarsi with the last four segments almost entirely white, with a very narrow dark line beneath, the second segment more extensively dark beneath on the basal third. Hind tarsi entirely dark. Last segment of mid tarsi (fig. 1, *bo*) over three times as long as its greatest breadth, with a swelling in the middle of the underside bearing one small slender spine, its claws both rather small, slightly curved, nearly equal in length, but one much stouter than the other. Hind tibiae about one-fourth shorter than the middle ones, with about six longish bristles on the underside, none dorsally. *Wings* with the scales all dark, the outstanding ones mostly rather short, narrowly ovate. Upper fork-cell about twice as long as its stem. Wing-length, 2·8 mm.

♀. Coloration exactly as in the ♂. Antennal hair-whorls somewhat shorter. Middle claws both alike. Wing-scales rather longer and denser.

Cotypes, 2 ♂, 1 ♀, Issororo, N.W. district, ix.1921, bred from larvae inhabiting bases of pineapple plant ; also 2 ♀, same locality and date, bred from larva inhabiting bromelias.

The only described species which seems to be nearly allied to this is *W. aphobema*, Dyar, in which the male claspers are much more slender, and which probably differs also in the structure of its middle feet.

Wyeomyia aphobema, Dyar.

2 ♂, Issororo, ix.1921, bred from larvae inhabiting bases of leaves of pineapple plant, associated with *W. bodkini*, sp. n., and *W. telestica*, D. & K.

The coloration of these examples is almost precisely as in *W. bodkini*, which I at first took to be merely a form of *W. aphobema* ; but the male hypopygium differs distinctly and agrees fairly well with Dyar's description and subsequent figure. According to Dyar's description the mid-tarsi are white *beneath*, but this is perhaps an error, since in the specimens before me the white on the mid tarsi extends almost all round, but leaves a narrow *dark* line beneath, as in *W. bodkini*. The male claspers apparently bear only three fine hairs and only two minute terminal spines.

The last mid tarsal segment (fig. 1, *a*) is only a little over twice as long as its greatest breadth, and bears four small spines in the middle beneath ; its claws are very unequal, the larger one strongly curved, sickle-shaped.

Wyeomyia flavifacies, sp. n.

♀. *Head* dark, the scales with a purplish reflection ; a narrow silvery margin to the eyes, enlarging above into a small bluish-silvery vertical spot. Eyes separated by a narrow unscaled line. Clypeus large, pale yellow, shining, bare. Proboscis slender, a little longer than the abdomen, tip not enlarged, uniformly dark-scaled. Palpi slender, dark, about as long as the clypeus. Tori yellowish, covered with a distinct grey dusting. Flagellar joints dark ; hair-whorls very long. *Thorax* with the integument ochreous. Prothoracic lobes with violet scales. Pro-epimeral scales golden. Mesonotum and scutellum with broad dark brown scales. Pleurae white-scaled. Two spiracular bristles ; no pro-epimeral. Postnotum with about eight black bristles. *Abdomen* blackish above, golden below, the colours separated in a straight line. *Legs* blackish ; front femora with a whitish line antero-ventrally, extending the whole length ; knees narrowly pale ; front and mid tarsi entirely dark, also the first two segments of the hind tarsi (last three missing). *Wings* with dark scales, the outstanding ones linear. Upper fork-cell more than twice as long as its stem. Wing-length, 3 mm.

Type ♀ (unique), Aruka River, 16.ix.1921 ; bred from larvae inhabiting bromelias.

I can find no described species which resembles this at all closely.

C.—A New *Stegomyia* from Nyasaland.

Aëdes (Stegomyia) woodi, sp. n.

♀. Closely allied to *A. simpsoni*, Theo., differing only in mesonotal ornamentation, as follows :—The white patch on the anterior margin is smaller and composed of narrower scales. The two main white patches are much smaller, rather narrowly crescent-shaped, almost as in *A. argenteus*. The two admedian golden lines are more evident than is usual in *A. simpsoni*, and run distinctly the whole length of the mesonotum. The pair of shorter lines in front of the scutellum are golden instead of white, and composed of very narrow scales. The scutellum has white scales on the median lobe, black scales on the lateral lobes.

Nyasaland : Cholo, 20.iv. 1916 (*R. C. Wood*).

Type ♀ presented to the British Museum by the Imperial Bureau of Entomology.

In its thoracic ornamentation this species shows a closer approach to *A. argenteus* than does any other known African species. From *A. apicoargentea*, the only other African species with similar scutellar scaling, *A. woodi* differs in leg-markings and in other respects.

D.—On the Grouping of the Ethiopian Species of *Culex*, with Notes on Certain Species.

Since the publication of my paper on the African species of *Culex*, much work has been done on the genus ; many new species have been described, and a considerable number have been reared from larvae. More recently a fresh study of the adults has enabled me to discover additional characters which seem to be valuable for the separation of the species into groups, and for the discrimination of some closely-allied forms. We are therefore now in a much better position for arriving at a natural classification of the genus.

As I would now define the genus, it should include *Culiciomyia*, *Eumelanomyia*, *Protomelanoconion* and *Micraëdes*, but, on the other hand, *Culex tigripes* should be transferred to the genus *Lutzia*, which it will be convenient to recognise as distinct from *Culex*. For the classification of the genus in a natural manner, the most reliable characters seem to be those of the male hypopygium, and as will be mentioned below, there are one or two interesting cases of the correlation between these structures and points in the larval morphology. However, to base a classification entirely or even mainly on the male genital characters is very inconvenient, and I have therefore searched for others which will be applicable to both sexes. Although much remains to be done, it may be useful now to mention the results so far obtained.

A very important distinction seems to be in the presence or absence, and in a few cases the duplication, of the bristle on the lower part of the mesepimeron. I have already used this character for the separation of *Lutzia* from *Culex*, the former genus having at least six lower mesepimeral bristles, while the latter has 0–4, but generally one. It now appears that a further use can be made of these bristles in dividing up the genus *Culex*.

Another point of importance is in the distribution of scales on the pleurae. Too little attention has been given to this by previous writers (myself included). It would seem from my recent studies that the presence or absence of scales on particular areas of the pleurae is constant for each species. The scales are of course liable to denudation, and only perfect specimens can be discussed in this respect, but the pleural scales are better protected and therefore less easily denuded than those of the mesonotum. The two areas which seem to be of the most importance in this connection are the mesepimeron, and the area immediately behind the prothoracic spiracle. The latter area (post-spiracular) is never completely covered with scales in *Culex*, but in some species there is a patch of flat white scales on its anterior margin, adjoining the spiracle. The size of the patch of scales on the mesepimeron varies with the species, and in some it is entirely absent.

The palpi of the females often provide useful specific distinctions, in their length (relatively to the clypeus or to the proboscis) and in the proportionate lengths and breadths of their segments. Sometimes the distinctions in this respect are quite marked even between closely allied species.

The Ethiopian species of *Culex* may be divided into four main groups, to which must be added, perhaps as distinct subgenera, the four other minor groups, *Protomelanoconion*, *Micraëdes*, *Culiciomyia* and *Eumelanomyia*, all of which show affinity in one way or another with the fourth of the main groups. These groups may be briefly considered.

Group I. The *bitaeniorhynchus* group. Lower mesepimeral bristle absent ; proboscis with a distinct and not very broad pale ring in the middle ; tarsi with narrow pale rings embracing both ends of the segments. Male aedoeagus generally of complicated structure, usually with one or more pairs of dorsally-directed hooks.

This is evidently a natural group, and includes all the ringed-legged species except *C. duttoni* and *C. ventrilloni*. It divides into two series, as follows :—

1. The *bitaeniorhynchus* series (*C. quasigelidus*, *C. consimilis*, *C. annulioris*, *C. giganteus*, and *C. bitaeniorhynchus*, with its variety *aurantapex*). Pale scales of abdominal tergites to a large extent apical in position ; mesonotum tending to have the front two-thirds pale-scaled. Lobe of side-piece of male hypopygium without a well-marked leaf. Larva with the scales on the comb of the eighth segment few and large ; siphon long. Should it be considered desirable to treat this series as a separate subgenus, the name *Aporoculex* is available, having been proposed for *C. quasigelidus*.

2. The *sitiens* series (*C. sitiens*, *C. thalassius*, *C. tritaeniorhynchus*). Pale scales of abdominal tergites mainly basal ; mesonotum with the pale scales fewer and more scattered. Lobe of side-piece with a well-marked leaf. Larva with the scales on the comb of the eighth segment numerous and small.

Group II. The *duttoni* group. Three (in some specimens two or four) lower mesepimeral bristles present. Aedoeagus of simple structure. Lobe of side-piece with a well-marked leaf. Siphon of larva rather short and swollen towards the middle.

This includes only three species, *C. duttoni*, Theo., *C. watti*, Edw., and *C. pruina*, Theo. Though they are very dissimilar in coloration, the points of similarity in the mesepimeral bristles, in the male hypopygium and in the larval siphon clearly indicate that they are related. *C. duttoni* is obviously not closely connected with the other ringed-legged species ; apart from the more important differences mentioned above, the colouring of the proboscis is quite unlike that of any member of the *bitaeniorhynchus* group.

Two quite different larvae have been attributed to *C. pruina*, but in view of the resemblances now discovered between the adults of this species and of *C. duttoni*, it will be safe to assume that Ingram and Macfie were correct in their determination, while Graham was in error.

This group is not very clearly marked off from the next, *C. guiarti* and *C. grahami* being in some respects intermediate. The last-named species has two lower mesepimeral bristles. The Palaearctic *C. laticinctus*, Edw., shows some affinity with this group, both as regards adult and larva.

Group III. The *pipiens* group. One lower mesepimeral bristle (two in *C. grahami*). Proboscis and tarsi without pale rings (except in *C. ventrilloni*). Abdominal tergites with basal pale markings (bands or more or less distinct lateral spots). Male aedoeagus nearly always of complicated structure (rather simple in *C. guiarti* and *C. grahami*, but then, as in most of the other species, with a pair of processes from the lower bridge), but without dorsally-directed hooks. Lobe of side-piece with a distinct leaf. Larval siphon generally elongate and slender ; comb of eighth segment with numerous small scales.

This group includes the majority of the Ethiopian species. It may be divided into the following two series :—

1. The *pipiens* series. Male palpi with a white line on the lower surface of the last two segments. Abdominal tergites with complete basal pale bands (except

in varieties of *C. pipiens*, *C. fatigans* and *C. univittatus*). The following Ethiopian species belong to this series :—

C. ventrilloni, Edw.
C. tipuliformis, Theo.
C. univittatus, Theo.
(with var. *neavei*, Theo.)
C. simpsoni, Theo.
C. pipiens, L.
C. fatigans, W.
C. pallidocephalus, Theo.
C. mirificus, Edw.
C. andersoni, Edw.
C. trifilatus, Edw.

Of these species, *C. ventrilloni* is well distinguished by its basally-ringed tarsal segments, *C. tipuliformis* by its lined femora and tibiae, and *C. univittatus* and *C. simpsoni* by the presence of post-spiracular scales. *C. neavei*, Theo., is structurally identical with *C. univittatus*, of which it should doubtless be regarded as a variety. The presence of post-spiracular scales will help to distinguish it from the members of the next series.

2. The *decens* series. Last two segments of male palpi dark beneath (traces of a white line in *C. laurenti* only). Abdominal tergites with basal lateral pale spots (bands complete only in the typical form of *C. decens*).

This series is exclusively Ethiopian, and comprises the following species :—

C. argenteopunctatus, Ventrillon.
C. laurenti, Newst.
C. decens, Theo. (with var. *invidiosus*, Theo.).
C. ornatothoracis, Theo.
C. perfidiosus, Edw.
C. perfuscus. Edw.
C. trifoliatus, Edw.
C. scotti, Theo.
C. grahami, Theo.
C. guiarti, Blanch.
C. ingrami, Edw.

C. argenteopunctatus differs from the other species not only in the conspicuous silvery spots on the thorax, but also in the possession of a conspicuous patch of post-spiracular scales. It seems, however, to be quite in place in this series. The last three species mentioned diverge in having the male aedoeagus of rather simple structure, and in some specimens at least, in the possession of two lower mesepimeral bristles. The larval siphon, however, is extremely elongate, and they seem better placed here than in the *duttoni* group.

Group IV. The *rima* group. One lower mesepimeral bristle (none in *rubinotus*). Proboscis and tarsi without pale rings. Abdominal tergites with the pale markings apical (sometimes absent). Aedoeagus of simple structure, often tuberculate, no processes from lower bridge. Lobe of side-piece with a distinct leaf. Eighth sternite of ♂ deeply emarginate, allowing the hypopygium to project downwards. Larva as in Group III.

This group corresponds more or less to Dyar's subgenus *Neoculex*. There are only five Ethiopian species. *C. pulchrithorax*, Edw., is extremely distinct on account of the five white lines on the black thorax, suggesting a *Stegomyia* or *Finlaya*. The other four species (*C. rima*, Theo., *C. rubinotus*, Theo., *C. salisburiensis*, Theo., and *C. kingianus*, sp. n.) are at first sight very similar, but nevertheless show well-marked distinctions. They are dealt with in more detail below.

Culex ornatothoracis, Theo.

I have previously given this as a synonym of *C. decens* var. *invidiosus*, on account of the fact that the hypopygia are nearly, if not quite, identical. There is, however, a very noticeable difference in thoracic ornamentation, and apart from this there seems also to be a difference in the structure of the female palpi ; those of *C. decens* are considerably shorter, the second (last) segment less than twice as long as the first, while in *C. ornatothoracis* the second segment is quite three times as long as the first. The species are therefore probably distinct.

Culex trifoliatus, Edw.

This species can be distinguished from most of its allies by having the tip of the hind femora more broadly dark, the apical sixth being dark all round.

A good series has been received from the southern Sudan (*H. H. King*; various localities) and I have also seen the species from the Congo.

Culex rima, Theo.

This species may be very readily distinguished by the pleural markings. The ground-colour of the pleurae is pale; a broad blackish stripe adjoins the margin of the mesonotum, and there is another but much narrower dark stripe some way below and parallel with the upper one. These markings vary somewhat in intensity, and in immature specimens are faint, but are always traceable. Apart from this, the female may be known by its palpi, which are very much longer than in the other three species of the group, and about three times as long as the clypeus, the last segment being longer than the basal segments together.

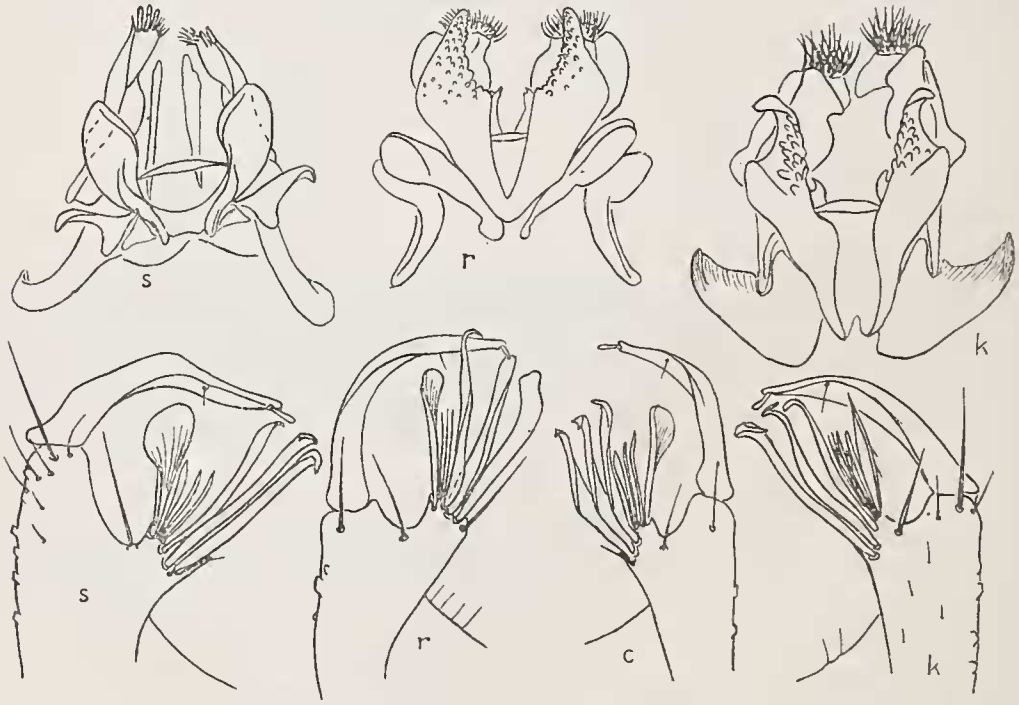

Fig. 3. Ethiopian species of *Culex*; upper row, anal and genital parts, from above; lower row, clasper and apex of side-piece, from the side: (*s*) *C. salisburiensis*, Theo.; (*r*) *C. rima*, Theo., specimen from the Sudan; (*c*) *C. rima*, specimen from Old Calabar; (*k*) *C. kingianus*, sp. n.; all × 180.

In the hypopygium, the most noteworthy points are the membranous subapical expansion of the tenth sternites, and the long slender clasper. The lobe of the side-piece bears three long flat plates (in place of the usual rods), three short and more or less flattened bristles, and a large round-tipped leaf. The three plates vary rather considerably in shape in specimens from different localities.

There are no mesepimeral scales, and the lower mesepimeral bristle is distinct.

Culex kingianus, sp. n.

♂. *Head* with narrow white scales dorsally, flat white ones at the sides, extending upwards as a narrow border to the eyes almost to the vertex. Upright scales dark

brown. Bristles black. Eyes touching. Tori and clypeus dark brown, bare, somewhat shining. Proboscis normal, with dark brown scales. Palpi with dark brown scales, only exceeding the proboscis by about half the length of the last segment. Long segment without hairs ; last two segments rather conspicuously hairy, gradually tapering, not very distinctly separated, penultimate about half as long again as the terminal. *Thorax* dark brown, integument somewhat shining, without dark markings either on mesonotum or pleurae. Mesonotal bristles light brown ; scales dark brown, moderately large. A narrow line of inconspicuous pale flat scales extending vertically across the sternopleura. Mesepimeron without scales ; a distinct lower mesepimeral bristle. *Abdomen* rather long and narrow, black-scaled dorsally, with faint traces of apical lateral segmental pale spots ; venter rather dark brown, apical margins of sternites pale. Eighth sternite deeply emarginate apically, as in other species of this group. Hypopygium : lobe of side-piece with three long, slightly sinuous rods with hooked tips ; five or six shorter and more or less flattened bristles ; a broad but sharply pointed leaf, and the usual apically-placed bristle. Clasper moderately long, gently curved. Tenth sternites with rather long and dense terminal spines ; no basal arm ; no subapical membranous expansion. Mesosomal lobes with their inner faces tubercular ; tips turned outwards. *Legs* dark brown ; hind tibiae without a pale spot at the tip ; hind femora white beneath and on the outer side to the tip. *Wings* with the outstanding scales somewhat clavate ; fork-cells rather longer than their stems, base of upper slightly nearer the wing base ; cross-veins separated by quite twice the length of the posterior. Wing-length 3–3·5 mm.

♀. Resembles the ♂. Palpi short, terminal segment about as long as the clypeus, somewhat swollen, hairy at the tip.

SUDAN : River Menzi, 4.iii.1911, 3 ♂ (including type) ; Bundle to Hierallah, 20.iii.1911, 1 ♂ (*H. H. King*). Presented to the British Museum by Mr. F. V. Theobald. S. NIGERIA : Lagos, xii.1901, 1 ♀ (*Dr. H. Strachan*) ; Degema, x–xii.1910, 1 ♀ (*Dr. J. W. Collett*). ASHANTI : Obuasi, ix.1907, 1 ♀ (*Dr. W. M. Graham*).

Distinguishable from *C. rubinotus* by the larger mesonotal scales, presence of lower mesepimeral bristle, and shorter ♂ palpi ; from *C. salisburiensis* by the absence of mesepimeral scales and shorter ♂ palpi ; and from *C. rima* by the unmarked pleural integument ; also from all these by the structure of the hypopygium.

Culex rubinotus, Theo.

In this species the mesonotal scales are very small, much smaller than in its three allies, and in some conditions of illumination appear quite black. The mesonotal integument is reddish, but not always of such a bright brick-red as in the type. The pleural integument is lighter than that of the mesonotum, without dark markings. The mesepimeron is remarkable in having no bristle on its lower part ; nor has it any scales. Palpi of ♂ longer than the proboscis by the last segment and half the penultimate ; last two segments about equal in length. Palpi of ♀ with the last segment rather short and swollen, though less so than in *C. salisburiensis*. Hypopygium : lobe of side-piece with two (or three ?) long rods, two shorter curved appendages, and a moderately broad but pointed leaf. Clasper rather short and broad. Basal parts almost as in *C. kingianus*, but the lateral angles of the mesosomal lobes are more prominent, and their tips are not recurved.

At present only the type ♀ of this species has been recorded, but additional material has been received at the British Museum as follows :—UGANDA : Kampala Swamp, xi.1909, 1 ♂, 1 ♀ (*Major A. D. Fraser*). SUDAN : Meridi, 12.iii.1911, 1 ♀, and Idris, 16.iii.1911, 1 ♀ (*H. H. King*).

Culex salisburiensis, Theo.

As in the case of *C. rima*, the abdominal markings of this species are variable, the tergites sometimes having complete apical white bands, sometimes lateral spots only. The species may be known from its allies by the possession of a large patch of scales on the basal half of the mesepimeron. The lower mesepimeral bristle is present. Hypopygium: side-piece much as in *C. rima*, but clasper somewhat bent. Mesosomal lobes flat, pale, and devoid of tubercles. Tenth sternites with few spines, the inner ones bristly, the outer ones stout and blunt-tipped.

Culex horridus, nom. n.

Protomelanoconion fusca, Theobald, Mon. Cul. v, p. 463 (1910).

This change of name is necessary since the specific name *fuscus* is preoccupied in *Culex* by *Trichorhynchus fuscus*, Theo. The species is extremely close to the Oriental *C. brevipalpis*, Giles, but differs rather noticeably in the structure of the aedoeagus. This organ is of simple structure, with the lobes tubercular, as in several species of the *rima* group. The clasper is simple. It can hardly be included in the *rima* group since the abdominal tergites have basal instead of apical pale spots; moreover the species is well distinguished from all other Ethiopian species except *C. inconspicuosus* by the unusually long and stout bristles which occur over nearly the whole of the mesonotum. This character (which has suggested the specific name), together with the absence of flat scales on the top of the head, may perhaps be used to define the subgenus, which should probably include some species in which the palpi are alike in the two sexes; among others, perhaps, the type-species of *Micraëdes*.

Culex inconspicuosus, Theo.

Aëdes inconspicuosus, Theobald, Entom., xli, p. 109 (1908).

Although very similar in general appearance to *C. horridus*, this species may be readily distinguished from all other African *Culex* by the entire replacement of the narrow scales of the head by flat ones. The abdomen is without pale markings. As in *C. horridus* there is a single well-marked lower mesepimeral bristle. The male aedoeagus has the simple type of structure, but the clasper is peculiar in having a large projecting dorsal process. The Oriental *C. malayi* is closely allied but quite distinct.

I have referred this species to the subgenus *Micraëdes* on account of the very short male palpi. It differs, however, from the type of the subgenus (*M. bisulcatus*, Coq.) in its flat-scaled head and forked claspers, both these characters being of more importance than those of the palpi. If, therefore, it is desired to place it in a separate subgenus, a new name will probably have to be proposed, unless the insufficiently known *Aedinus*, Lutz, should prove to be applicable.

Culex albiventris, nom. nov.

Eumelanomyia inconspicuosa, Theobald, Mon. Cul. v, p. 240 (1910).

Theobald's specific name being preoccupied by his *Aëdes inconspicuosus* (both species really belonging to *Culex*) the above change of name is necessary.

There are two varieties of this species: in one the mesonotal scales are all blackish, in the other there are large whitish patches on the shoulders. The two are identical in all other respects. The species may be easily known by the black dorsum and pure white venter; as well as by the head scaling and the palpal structure of both sexes. The hypopygial structure is as in *Culiciomyia*, but the absence of a comb of scales on the male palpi excludes the species from that subgenus.

Culex (Culiciomyia) nebulosus, Theo.

?*Culex invenustus,* Theo.
C. pseudocinereus, Theo.
?*C. nigrochaetae,* Theo., ♀.
Pectinopalpus fuscus, Theo.

A more intensive study of the African *Culiciomyia* has revealed the fact that there exist three quite distinct types of male hypopygium, which I now consider should be regarded as distinct species, though the distinctions are otherwise very feebly marked. I have, however, examined a number of hypopygia of each form, and have seen no suggestion of intergradation. All three forms are widely distributed.

C. nebulosus was described from females only, and it is therefore largely a matter of conjecture to which form the name should be applied. I propose to fix it on the one which seems to be the commonest.

Hypopygium : side-pieces with a rather small ventro-lateral patch of hair. Lobe moderately large, with three spines and two leaves, but without a patch of fine curved hairs ; the spines are moderately stout, the basal one straight and shorter than the other two, which have curled tips, middle spine the stoutest of the three ; the leaves are very unequal in breadth, the apical one being very much broader than the other, and nearly as broad as long. Clasper bent in the middle, with a membranous expansion all round the outside of the bend, and with a conspicuous subapical spiny crest. Lobes of mesosome each with an apical fringe-like process which is moderately stout and about as long as the swollen basal part ; at the base of the finger on the inner side is a well-marked tooth ; the pair of fingers rather widely separated. Tenth sternites short and stout, without basal arm ; apical spines numerous, those on the outer side stout and blunt.

Vein-scales towards tip of wing slightly clavate. Pleurae with the integument uniformly dark, heavily dusted with grey. Coxae with patches of white or whitish scales.

I have seen males of this species from the following localities :—Gold Coast : Obuasi (*Graham*) ; Accra (*Connal*). Sierra Leone : Daru (*Murphy*) ; Freetown (*Bacot, Gratton*). S. Nigeria : Lagos (*Strachan*). Belgian Congo : Kabinda (*Schwetz*) ; Coquilhatville (*Massey*). Uganda : Busu (*Fraser*). Sudan : Kajo Kaji (*King*). Rhodesia : Salisbury (*Marshall*). Tanganyika Terr. : Dar-es-Salaam (*Pomeroy*).

Culex (Culiciomyia) cinereus, Theo.

?*Culex impudicus,* Ficalbi.
?*C. mundulus,* Grünberg.
Culiciomyia freetownensis, Theo.
C. uniformis, Theo.

This species is distinctly larger on the average than *C. nebulosus,* being about the size of *C. pipiens.* I can find no constant external distinctions between the two, but of *C. cinereus* there are two rather well-marked varieties : (*a*) type form : mesepimeron with a large patch of white scales almost covering its basal half, abdominal tergites with large greyish-white apical lateral patches, upper fork-cell in ♀ less than three times as long as its stem ; (*b*) var. *uniformis* : mesepimeron with only a few pale scales near its base, abdominal tergites with few or no pale scales apically, upper fork-cell in ♀ fully three times as long as its stem. These two varieties have identica hypopygia, and differ from *C. nebulosus* as follows :—side-pieces somewhat more swollen and with a larger ventro-lateral hair-patch. Lobe larger, the spines rather stouter and more widely separated ; a patch of about 20 soft curved hairs on the apical part of the lobe. Mesosome constructed as in *C. nebulosus,* but rather more strongly chitinised.

Unless the Mediterranean *C. impudicus* should prove to be the same, this species appears to be confined to West Africa. I have seen males from the following localities only: Sierra Leone: Freetown (*Austen*). Gold Coast: Bibianaha (*Spurrell*); Obuasi (*Graham*); Koforidua (*Corson*).

Culex (Culiciomyia) cinerellus, sp. n.

Differs from *C. nebulosus*, Theo., as follows:—Average size smaller (and therefore much smaller than *C. cinereus*). Pleurae slightly shining, not distinctly dusted with grey, without scales; darker towards mesonotum and sternum, the intermediate part slightly but distinctly paler. Wing scales linear. Coxae apparently without scales. Hypopygium: side-piece without ventro-lateral hair-patch. Lobe smaller; spines longer in proportion and more slender, placed close together, with one long and two short associated bristles; leaves both quite short and narrow. Clasper less bent, with a less distinct membranous expansion. Finger-like processes of mesosome placed close together, very long and slender, about twice as long as the basal part, without a distinct tooth at the base.

Uganda: Kasala, ix.1910, reared from larvae, type ♂ and 4 ♀ (*Major A. D. Fraser*). Sudan: Kapei, 1.iv.1911, 1 ♂ (*H. H. King*). S. Nigeria: Lagos, 15.viii and 21.xi.1910, 2 ♂, 1 ♀ (*Dr. W. M. Graham*).

E.—On a Collection made by Dr. H. Cogill at Karwar, N. Kanara, India.

In February 1922 a collection of about 350 specimens of mosquitos, together with some other insects, was presented to the British Museum by Dr. H. Cogill, the material having been collected by him while at Karwar, N. Kanara, India, in the years 1901–5. The collection is of historical interest, since it contains a number of examples of *Anopheles culiciformis*, Cogill, which, until its recent redescription by Christophers and Khazan Chand (Ind. Jl. Med. Res., iii, No. 4, 1916), was not known to exist in any public collection, and the original types were supposed to have been lost. Below are given notes on the more interesting species in the collection, including descriptions of two which are apparently new to science.

Anopheles (Anopheles) culiciformis, Cogill.

The collection contains several examples of each sex of this species, besides a few mounted larvae. Both adults and larvae agree almost entirely with Christophers' and Khazan Chand's detailed description, the only difference being that the female palpi are decidedly less shaggy, the scales being rather closely applied. The palpi in both sexes, however, are decidedly stouter than those of *A. aitkeni*. I cannot detect palmate hairs on the thorax of the larvae, but these were described and figured by Cogill and are no doubt present in perfect specimens. Since no type specimen was selected by Cogill, the examples in this collection may be regarded as cotypes.

Anopheles (Myzomyia) subpictus var. **vagus,** Dön.

This is represented in the collection by a number of examples, being about as numerous as the type form. In one example the dark wing-markings are greatly reduced, being almost confined to three very small patches on the costa and first vein. This specimen is interesting as lending support to the view, which has been expressed by Swellengrebel and adopted by the present writer, that Theobald's *A. immaculatus* is merely an albinoid aberration of *A. subpictus* var. *vagus*.

Anopheles (Myzomyia) minimus, Theo.

This is the most abundant *Anopheles* in the collection, and, as indicated by the labels attached, is the species which was recorded by Cogill as *A. fluviatilis*. All the specimens are of the typical form, the proboscis being dark both above and below;

the outer half of the sixth vein all dark ; no pale fringe-spot at the sixth vein. The amount of dark scaling on the third vein is variable ; in the majority of specimens only the middle third of the vein is pale.

I may mention here what seems to me to be the best distinguishing character of the larva of this species : the chitinised plates on the anterior margins of the abdominal segments are all extremely large, so much larger than in almost all other *Anopheles* that the species may be recognised at a glance under a hand lens. Swellengrebel has described and figured these structures in *A. minimus* var. *aconitus*, but does not emphasise their importance or make use of them in his key. The plates are almost or quite the same in the African *A. funestus*, this being the only other species, among those which I have examined, which shows them of anything like the same size as in *A. minimus*. According to James and Liston's figures the plates are quite small in *A. culicifacies*, but large in *A. listoni*, though in the figure of this latter species they appear much narrower than they are in *A. minimus* and *A. funestus*. If Christophers is correct in regarding *A. listoni* as identical with *A. funestus*, this figure is probably inaccurate. *A. funestus* and *A. minimus* are very closely allied species, differing mainly in the markings of the female palps, the two outer pale bands being broader in the latter species. The two occupy to a large extent separate geographical areas, and might perhaps be regarded as representative forms of the same species.

Uranotaenia alboannulata, Theo.

The collection contains 1 ♂, 2 ♀. The species was previously known only from Theobalds' type ♀. I have formerly considered it identical with the Malayan *U. trilineata*, Leic., but it differs in the absence of a median white ring on the first hind tarsal segment, and perhaps in some other small particulars. The legs of the ♂ exhibit no peculiarities of structure.

Uranotaenia campestris, Leic.

The collection contains several specimens, representing both sexes ; they agree well with Leicester's cotypes in the British Museum, except that the scales towards the base of the first vein are less conspicuously white, and in some specimens hardly paler than the remaining wing-scales. The first front tarsal segment of the ♂ of this species is scarcely longer than the second, that of the ♀ being about one-half longer. The species has previously been recorded only from the Malay Peninsula.

Uranotaenia recondita, sp. n.

Head clothed with rather light brown flat scales and dark brown upright scales. Proboscis dark, moderately slender, slightly longer than the abdomen, scarcely swollen at the tip. Palpi longish, exceeding the clypeus by nearly twice its length. Antennae of ♀ longer than the proboscis by the length of the last two segments, pubescence rather long and evenly distributed along the segments ; of ♂ scarcely as long as the proboscis. *Thorax* dark brown ; integument of pleurae lighter, without dark markings. Mesonotal bristles very long, black ; scales narrow, dark brown ; no pre-alar line of flat scales ; two bare lines between the rows of bristles. Pro-epimera and sternopleura with a few light brown flat scales. One spiracular bristle. *Abdomen* blackish brown above, light brown below, devoid of markings. *Legs* dark brown ; undersides of femora somewhat lighter. First segment of front tarsi of ♂ almost as long as the tibia, that of the ♀ distinctly shorter ; legs of ♂ otherwise unmodified. *Wings* with the scales all dark on the veins, outstanding scales translucent and lanceolate. Upper fork-cell only about a quarter as long as its stem. Wing-length, 2·5 mm.

Type ♂, Karwar, 13.x.1902 ; paratypes, 3 ♀, 12–14.viii.1902.

This is an obscure species, not very easy to recognise ; it is perhaps most nearly allied to *U. brevirostris*, Edw., and *U. obscura*, Edw., both of which have shorter

proboscis and palpi, and comparatively longer antennae in the ♀, these being fully one-third longer than the proboscis. *U. metatarsata*, Edw., is similar in coloration, but differs remarkably in the front legs of the ♂.

Aëdes (Finlaya) cogilli, sp. n.

♀. Differs from *A. (F.) gubernatoris*, Giles, as follows :—*Head* without a median pale stripe, the eye-margins narrowly silvery white. Pro-epimera bare, except for a small patch of silvery-white scales on the posterior margin. Anterior white patch of mesonotum somewhat larger and more silvery ; pre-alar white patches smaller. Scutellum with the median lobe densely covered with flat silvery-white scales ; lateral lobes with a few flat black scales. Second pale ring on mid tarsi much narrower than is usual in *A. gubernatoris* ; a rather well-marked pale spot at the junction of the second and third hind tarsal segments.

Cotypes, 2 ♀, Karwar, 6.x.1902 and 2.ix.1902.

Culex (Micraëdes ?) khazani, Edw.

I have recently described this species from a male collected by Khazan Chand at Pudupadi, S.W. India ; this male was somewhat immature and shrivelled, and did not allow of a precise description of all its characters. Dr. Cogill's collection contains two females, one of which is very perfect, and enables me to give a number of additional characters for the species.

Head with a broad margin of flat scales round the eyes ; posteriorly with a large area of narrow pale ones. Proboscis rather long for a *Culex*, being distinctly longer than the front femora. *Thorax* with the mesonotal bristles unusually long and strong, and extending the whole length. Integument of mesonotum dark brown ; a blackish brown patch, indistinctly margined, on each side just in front of the wings. Integument of pleurae pale, with a large blackish brown spot occupying the lower half of the mesepimera ; no dark line above this. Lower mesepimeral bristle small and pale. Scarcely any scales on pleurae. Scutellum with narrow dark brown scales like those of the mesonotum. *Abdomen* blackish brown ; venter only a little paler than the dorsum ; no trace of pale lateral spots. *Legs* blackish ; hind femora white almost to the tip on the outer side, and on the basal three-fourths on the inner side.

Culex (Micraëdes ?) malayi, Leic.

Numerous specimens. In some of the males the abdomen has a faintly banded appearance to the naked eye, the segments being thinly scaled towards the base.

Culex (Culex) bitaeniorhynchus var. **ambiguus,** Theo.

Numerous specimens, all of this variety. The type form was not represented in the collection.

Culex (Culex) cornutus, Edw.

Three males of this recently described species were present.

F.—New Species from Northern and Eastern Australia.

Aëdes (Chaetocruiomyia) spinosipes, nom. nov.

Chaetocruiomyia sylvestris, Theobald, Mon. Cul. v, p. 196, 1910 ; nec *Culex sylvestris*, Theobald [= *Aëdes vexans*, Mg.], Mon. Cul. i, p. 406, 1901.

This and the new species diagnosed below have a very peculiar fan-like tuft of extremely long scales on the small rounded knob at the base of the wing, close to

its articulation with the thorax, and projecting forwards in the direction of the longitudinal axis of the wing. I am not aware of any other mosquitos which show this feature, and it may perhaps be used to define *Chaetocruiomyia* as a valid subgenus of *Aëdes*, which genus it resembles in all essentials. In describing recently the Indian *Aëdes pulverulentus* I suggested a possible affinity to *Chaetocruiomyia*, but the Indian species does not possess a basal scale-tuft on the wings and is more probably related to the subgenus *Ecculex*.

The type ♀ possesses only two postspiracular bristles, and the head is mainly pale-scaled. Another ♀, collected by Dr. A. Breinl on Palm Island, N. Queensland, and presented to the British Museum by the Imperial Bureau of Entomology, has four postspiracular bristles placed in a row (quite an unusual arrangement) and the head has more dark scales at the sides. The two examples agree as regards thoracic, abdominal and leg-markings.

Aëdes (Chaetocruiomyia) humeralis, sp. n.

♀. Differs from *A.* (*C.*) *spinosipes*, Edw. (type ♀) as follows:—*Head* more extensively dark-scaled at the sides. The white area on the front half of the mesonotum is divided into two portions by a rather broad light brown band. Legs not quite so stout as in *A. spinosipes*; hind tibiae without any yellowish scales in the middle beneath; third hind tarsal segment with a distinct white ring at its base.

QUEENSLAND: Brigalow Scrub, Burnett River, 1911; biting (*Dr. T. L. Bancroft*).

Type and four other ♀♀ in the British Museum; presented by Mr. F. V. Theobald.

Aëdes (Finlaya) auridorsum, sp. n.

♀. Differs from *A.* (*F.*) *australiensis*, Theo., as follows:—Palpi longer, equalling nearly three segments of the antennal flagellum instead of only two. Scales on anterior two-thirds of mesonotum deep golden, not whitish. Abdominal tergites 6 and 7 almost entirely golden-scaled; sternite 8 much larger and more prominent. The first mid tarsal segment instead of having merely a narrow white basal ring, is white on the upper surface for the basal two-thirds of its length; the third mid-tarsal segment has a few white scales at its base. Hind tarsi with moderately broad white rings at the bases of the first three segments, last two segments dark, the last segment indistinctly paler than the penultimate. (The hind tarsi may be the same in *A. australiensis*, but are damaged in the type.)

♂. Coloration and scale characters as in the ♀. Palpi purplish black, equalling the proboscis in length, last two segments densely hairy. Hypopygium: side-pieces long and slender. Clasper moderately short, with rather short terminal spine. Claspette with long slender stem, the apical fourth narrowed, appendage with a very broad membranous expansion.

From the probably allied *Culex biocellatus*, Taylor, the new species differs in its entirely dark-scaled costa.

NEW SOUTH WALES: Sydney, 1915 (*Dr. E. W. Ferguson*), type ♀, presented to the British Museum by the Imperial Bureau of Entomology in 1915, and determined then provisionally as a variety of *A. australiensis*. QUEENSLAND: Brigalow Scrub, 1911, biting (*Dr. T. L. Bancroft*), 1 ♀, presented to the British Museum by Mr. F. V. Theobald in 1921; Eidsvold, 27.i.1914, reared (*Dr. T. L. Bancroft*), 1 ♂, 1 ♀, presented to the British Museum by the Imperial Bureau of Entomology in 1922, 1 ♀ in the Australian Institute of Tropical Medicine.

Aëdes (Finlaya) quinquelineatus, sp. n.

♀. *Head* with narrow golden scales on the nape and along the upper part of the eye-margins; two patches of flat black scales above, and pale flat ones at the sides. Proboscis slender, slightly longer than the front femora, black-scaled, with a rather

narrow whitish band in the middle of the ventral surface. Palpi about one-fifth as long as the proboscis, black-scaled, the tips rather narrowly silvery. *Thorax* dark brown, the mesonotum with five about equidistant lines of narrow golden scales ; median line forked well before the scutellum ; intermediate pair almost interrupted in the middle, some scattered golden scales tending to connect their posterior halves with the lateral lines at this point. Scutellum rather thickly covered with small flat white scales. Prothoracic lobes with flat white scales. Pro-epimera covered with flat black scales, a few paler ones below. Pleurae with a few small patches of flat white scales. Mesonotal bristles numerous, rather long, light brown. *Abdomen* dark brown dorsally, the tergites with small pure white lateral and small ochreous median basal spots. Venter ochreous. Eighth sternite moderately large, pale yellowish, without scales. Cerci short, blackish. *Legs* : femora dark brown, with narrow ochreous lines in front running almost to the tips, hind femora also pale beneath towards the base ; knee-spots conspicuous, silvery-white. Tibiae dark brown, the middle pair with a narrow ochreous line in front, tips dark. Tarsi with pure white rings at the bases of the first two segments, the hind tarsi also with similar rings on the third and fourth segments, fifth dark ; the rings just extend, on the upper surface, on to the tips of the segments. Front and middle claws toothed. *Wings* with dark brown scales, outstanding ones linear. Bases of forks level. Wing-length, 3 mm.

Queensland : No exact data (*Dr. T. L. Bancroft*, 1911).

Type ♀ presented to the British Museum by Mr. F. V. Theobald in 1921.

This species differs from *A.* (*F.*) *notoscriptus* in the markings of the mesonotum, and in many other points ; from all the Oriental species (*macdougalli*, Edw., *trilineatus*, Theo., etc.) which somewhat resemble it, it differs conspicuously in the scaling of the scutellum.

Aëdes (Finlaya) pecuniosus, sp. n.

Differs from *Calomyia priestleyi*, Taylor, as follows :—Vertical bristles golden, not black. Pale scales of thorax metallic silver rather than white ; a double median row of flat silvery scales extending from the front margin to a little in front of the scutellum, joining the patch which precedes and surrounds the bare space ; a small patch of similar scales on the front margin on either side of the anterior end of the median line ; sublateral lines on posterior third of mesonotum composed of broad, flat instead of narrow, spindle-shaped scales, and reaching forward to join the large silvery patches. Abdominal tergites with complete silvery-white basal bands, the last two almost entirely silvery. First two segments of front tarsi, and first three of mid and hind tarsi with basal white rings.

Northern Territory : Port Darwin (*C. L. Strangman*), type ♀ presented to the British Museum by Lt.-Col. A. Alcock in 1913.

The specimen was determined at the time as probably *Molpemyia purpurea*, Theo., but the type of Theobald's species shows no trace of the median line of silvery scales on the mesonotum. The three forms, *pecuniosus*, *purpurea* and *priestleyi*, form a very distinct group, and though closely related are probably specifically distinct. *A.* (*F.*) *purpureus* is intermediate between the other two, agreeing with *priestleyi* in its dark vertical bristles and in its thoracic ornamentation, but with *pecuniosus* in its abdominal and leg markings. Although none of the males are known, the species are probably referable to the subgenus *Finlaya*.

Aëdes (? Skusea) aurimargo, sp. n.

♀. *Head* with a rather narrow area of narrow golden scales in the middle reaching from occiput (where it is broadest) to vertex ; on each side of this a few flat creamy scales, then a large patch of black, then a smaller patch of ochreous, then black again, no narrow scales round eye-margins. Eyes separated by the width of

two or three facets. Bristles dark brown. Clypeus dark brown, bare. Tori ochreous, with a few small golden scales. Proboscis black-scaled, slender, but scarcely longer than the front femora. Palpi black-scaled, nearly a quarter as long as the proboscis. *Thorax* with dark brown integument. Prothoracic lobes with some flat scales in front, narrow golden ones behind. Pro-epimera densely clothed with flat creamy scales below, narrow golden ones above. Mesonotum with small narrow, curved scales; dorsally black, sides rather broadly golden; a narrow central golden line running the whole length, and a pair of shorter golden lines in front of the scutellum. Pre-scutellar bristles small; no bristles on disc. Mid lobe of scutellum with flat black scales on the basal half, flat creamy ones on the apical half; lateral lobes each with a few broadish curved creamy scales. Pleurae for the most part densely clothed with flat greyish-white scales; postspiracular area with a small patch of narrow curved golden scales; bristles all pale; four pro-epimeral, about six post-spiracular, two lower mesepimeral. *Abdomen* with the first tergite black dorsally, white laterally; tergites 2–7 with small median basal creamy spots, diminishing in size from the second to the seventh, and with large basal creamy lateral spots; venter creamy. Seventh segment as long as the sixth, but narrower; eighth rather small and retracted, but the sternite visible, densely clothed with short pubescence; cerci short and rounded. *Legs* slender, purplish black, femora pale beneath basally; the hind femora also laterally to about four-fifths. No pale knee-spots. All tibiae about equal in length; first hind tarsal segments as long as the tibia. Claws all simple and rather small. *Wings* with purplish black scales, outstanding ones linear to somewhat clavate (on upper fork-cell) with square ends. Fork-cells a little longer than their stems, base of upper a little nearer the apex of the wing than that of the lower. Wing-length 3 mm.

N. Australia: Moa Island (*G. F. Hill*, No. 1520).

Type ♀ (unique) in the Australian Institute of Tropical Medicine.

A very distinct species, with some resemblance to *A.* (*S*). *funerea* var. *ornata*, but with quite different abdominal and more sharply defined thoracic markings, different scutellar scaling, etc. The thoracic adornment is very similar to that of the Javan *Armigeres* (*Scutomyia*) *treubi*, de Meij., which differs in its stouter proboscis, shorter hind tibiae, toothed claws, etc.

Culex (Lophoceratomyia) hilli, sp. n.

Head clothed almost entirely with flat black scales (not easy to see on account of their colour), pale flat ones low down at the sides, and a small patch of brown narrow curved ones in the middle, just reaching the vertex. Proboscis and palpi black-scaled, the latter slender, bare, in the ♂ slightly longer than the proboscis, in the ♀ about one-sixth as long as the proboscis. A distinct thumb-like process at the base of each ♂ palp. Antennae of ♂ with the tori shiny black, bare, without prominence on the inner side; segment 2 nearly twice as long as broad, 3–9 about as long as broad; 10–12 each rather longer and more slender than the preceding; 13 twice as long as 14, 13 and 14 together about equalling 2–12 together; 6 with an outer row of four or five rather short and inconspicuous scales, the uppermost one rather longer and broader than the others, which are almost hairlike; 7 and 8 with the usual short twisted tufts; 9 with the usual long matted tuft; 10 with four or five long scales, broadest a little before the long sharp tips, directed externo-ventrally; 11 with four or five long hair-like scales, directed ventrally. *Thorax* with blackish brown integument, clothed rather densely with small dark brown curved scales and black bristles. Pleurae shining, somewhat lighter in colour than the mesonotum, with a few very small patches of inconspicuous pale scales; bristles black: four pro-epimeral, six rather widely spaced sternopleural, four or five pre-alar, one lower mesepimeral, two or three small upper mesepimeral, no spiracular. *Abdomen* black dorsally, the tergites with very small whitish basal lateral spots,

venter greyish white. Male clasper rather small, sickle-shaped, not at all swollen in the middle. *Legs* black, femora pale at the base beneath, no trace of pale knee-spots. Larger claw on front legs of ♂ toothed, all the remaining claws simple. *Wings* with blackish scales, which are rather denser than usual; most of the outstanding scales somewhat clavate. Wing-length, 2 mm. (♂)–2·6 mm. (♀).

Northern Territory: 70 miles south from Darwin (*G. F. Hill*, No. 1508).

Type ♂ in the British Museum, presented by the Imperial Bureau of Entomology; paratypes ♀ in British Museum and Australian Institute of Tropical Medicine.

This species is almost certainly identical with *Neomacleaya australis*, Taylor, described from N. Queensland, but that specific name is preoccupied in *Culex* by *C. australis*, Erichson. The nearest ally seems to be the Malayan *C.* (*L.*) *quadripalpis*, Edw., which differs in its lighter colour, hairy ♂ palpi, and slightly different antennal characters.

Culex basicinctus, Edw.

I proposed this name (Bull. Ent. Res., xii, p. 78, 1921) for some specimens sent by Mr. G. F. Hill from Queensland as *Leucomyia annulirostris*, Taylor, but which I believed to be *Leucomyia annulata*, Taylor; I believed the new name to be necessary because *L. annulata* was preoccupied by *Theobaldia* (*Culex*) *annulata*, Schrank, *Culex* (*Trichopronomyia*) *annulata*, Theobald, and *C.* (*Culiciomyia*) *annulata*, Theobald. It now appears that the specimens before me were not Taylor's *L. annulata*, nor were they his *L. annulirostris*, but a distinct and hitherto undescribed species. I am indebted to Mr. G. F. Hill for the loan of the types of both Taylor's species. The type male of *L. annulata* has unfortunately lost the tip of its abdomen, but is almost certainly identical with *Leucomyia vicina*, Taylor; this again may prove the same as Skuse's *Culex annulirostris*, Theobald's interpretation of this species being certainly incorrect. Taylor's *Leucomyia annulirostris* is a distinct species, but is identical with his *Culicada squamosa*, as I have ascertained by comparison of the types.

Since my name *Culex basicinctus* was actually proposed as a substitute for *Leucomyia annulata*, it might perhaps be strictly logical to place it now as a synonym of *C. vicinus*; but in proposing the name I mentioned some diagnostic characters of the species I had wrongly determined as *L. annulata*, and this fact will perhaps be sufficient to permit the retention of the new name for the new species. The synonymy of the three species concerned will therefore be as follows:—

Culex basicinctus, sp. n.	*Culex vicinus* (Taylor).	*Culex squamosus* (Taylor).
	Leucomyia vicina, Taylor.	*Culicada squamosa*, Taylor.
	Leucomyia annulata, Taylor.	*Leucomyia annulirostris*, Taylor.
	?*Culex annulirostris*, Skuse.	*Culex taylori*, Edw.

I append a description of *C. basicinctus*.

Head clothed on the vertex with narrow creamy scales; a patch of flat black ones towards each side, flat whitish ones outside these. Proboscis short, not much more than half as long as the abdomen, black-scaled, with a sharply defined whitish ring slightly beyond the middle and about a fourth as long as the proboscis; in the ♂ a small tuft of pale hairs at the base of the ring beneath. Palpi of ♂ with the long segment nearly as long as the proboscis; a narrow whitish ring at the constriction; a broad white ring in the middle of the second portion; apical third with long black hairs on the outer side; last two segments black-scaled, narrowly ringed with white at the base; last segment with the apical third white, two or three terminal black bristles; no white scales beneath on the black portions. Palpi of ♀ rather stout, about one-quarter as long as the proboscis. *Thorax*: mesonotum with the anterior two-thirds mostly covered with whitish or dull ochreous narrow scales, the anterior third with a variable amount of darker brown scaling;

posterior third mostly dark-scaled except on and in front of the scutellum. A patch of erect flat scales a little in front of the root of each wing, the anterior ones white, the posterior ones black. Prothoracic lobes with black and white flat scales ; pro-epimera with narrow whitish scales ; no post-spiracular scales ; sternopleura and mesepimeron each with two patches of flat white scales ; no lower mesepimeral bristle. *Abdomen* blackish-scaled dorsally ; all the tergites with basal white bands which are broadened in the middle, especially in the ♀ ; tergites 5–8 with narrow apical creamy banding, sometimes hardly perceptible ; tergites 6–8 in ♂, 7–8 in ♀, with the sides continuously white. Venter white, with two large black spots on each sternite, sometimes uniting to form a band. *Hypopygium* : side-pieces uniformly hairy ; lobe small, with two short, pointed spines, but no distinct leaf ; clasper short, rather stout, sickle-shaped. Tenth sternites broad, rather short, with a large terminal patch of fine hair, not spines ; no basal arm. Lobes of mesosome with two distinct divisions ; upper division broad, with one long downwardly directed point, and one shorter one nearer the base ; lower division a simple outwardly-directed sickle. *Legs* : femora mottled, the dark scales predominating on the front and middle pair, hind femora paler ; small but distinct knee-spots present. Tibiae dark, with narrow pale tips ; middle and hind pairs with narrow anterior and broader posterior white stripes. Tarsi with rather broad white rings at the bases of the first four segments, the white not extending to the tip of the preceding segment ; on the hind legs the ring on the third segment is slightly broader than the others and occupies nearly one-third of the segment ; the fifth segment also has a narrow white basal ring. *Wings* with the scales all dark ; outstanding ones linear ; base of upper fork-cell slightly nearer wing-base than that of lower. Wing-length, 3·5–5 mm.

Queensland : Townsville, in house, 9–10.vi.1920 (*G. F. Hill*), 6 ♂ (including type), 6 ♀, presented by the Imperial Bureau of Entomology ; Eidsvold, xi.1911 (*Dr. T. L. Bancroft*), 14 ♂, 1 ♀, presented by Mr. F. V. Theobald.

G.—A New *Armigeres* from the New Guinea Region.

Armigeres lacuum, sp. n.

Head mostly black-scaled in ♀, with a narrow white border to the eyes and a small white spot on the vertex ; in ♂ the white markings are more extensive, and the black is less intense. Clypeus in ♂ apparently bare ; in ♀ with two patches of small flat white scales. Tori with small flat white scales. Palpi blackish, about one-fifth as long as the proboscis in ♀, a little longer than the proboscis in ♂. Proboscis shorter than the front femora in both sexes, but in the ♀ it is more slender than usual in this genus. *Thorax* blackish brown dorsally ; a narrow white margin of narrow scales, more distinct in ♂ than in ♀ ; in ♂ also there is a whitish mark on the mid lobe of the scutellum, extending forwards a short distance, which is not present in ♀. Prothoracic lobes and pro-epimera with narrow white scales, broader below than above, and broader in ♂ than in ♀. *Abdomen* blackish dorsally ; tergites 1–7 with large rounded lateral white spots ; tergite 8 with a dorsal white spot. Venter white, sternites mostly with narrow apical black bands. Male hypopygium : side-pieces rather stout, pointed ; basal lobes not prominent, represented by a dense tuft of moderately long hairs, four or five of the most apical of which are thickened, almost spine-like. Claspers slender, slightly curved, slightly tapering at the tip, with about 20 equal-sized teeth. Tenth sternites moderate, simple, pointed. Lobes of mesosome scarcely crenulate apically. *Legs* blackish ; femora white beneath ; hind femora white to the tip on the outer side ; all tibiae about equal in length ; first hind tarsal segment about one-third shorter than the tibia. Claws normal, the middle pair in the ♂ being small, equal and toothed. *Wings* normal. Wing-length, 3·5–4 mm.

Ile des Lacs, E. of New Guinea (*Biró*, 1900–1901).

Type ♂ in Budapest Museum ; paratypes, 1 ♂ (without abdomen) 23 ♀, in Budapest Museum and British Museum.

The species is closely allied to *A. confusus*, Edw., differing in the much narrower white margin to the mesonotum in the ♂; denser hairs on the basal lobes of the side-pieces, and less crenulate mesosome; also in the possession of narrow dark bands on the sternites. It is possible that the ♀♀ are not conspecific with the ♂♂.

H.—On the Genera *Bironella* and *Leptosomatomyia*.

These two genera were erected by Theobald in 1905 (Ann. Mus. Nat. Hung, iii, pp. 69 & 110) for species from New Guinea represented in the Hungarian National Museum. Neither species has been found again since, and the exact systematic position of both has been a matter of some doubt. Recently, through the kindness of Dr. K. Kertész, I have re-examined the types and mounted the male hypopygia of each, and am therefore able to throw some further light on these interesting species. I give below the characters not mentioned or left doubtful in Theobald's descriptions.

Bironella gracilis, Theo.

♂. Palpi scarcely shorter than the proboscis (not only two-thirds the length, as stated by Theobald), the last segment not very much swollen. Last two segments of antennae scarcely any longer than the preceding two or three, which are slightly longer than the rest. Head and thorax both shaped as in *Anopheles*. Mesonotum somewhat shining, not darker at the sides, without any scales; abdomen also devoid of scales. Legs covered with small scales. Wing membrane with well-marked microtrichia.

Hypopygium: side-pieces short and stout, less than twice as long as their width at the base, basal membrane large and apparently striated; from the outer basal corner of each side-piece arises a stout curved finger-like process, which is more than half as long as the side-piece, finely pubescent towards its base, otherwise bare, its apical half strongly chitinised, tip blunt and slightly lobed. Apart from these processes, there are no spines on the side-pieces. Claspers rather long, nearly cylindrical, with a post-median lump on the outer side, terminal claw short and broad. Ninth tergite a narrow, transverse oval, posterior margin simple. Anal segment membranous, elongate-conical, two-thirds as long as the side-piece. Aedoeagus (theca) a long, slender, cylindrical tube, with a single pair of reflexed leaflets at its tip, the leaflets a little over a quarter as long as the tube.

The above data are sufficient to establish *Bironella* as a distinct genus of the Anophelini, the position assigned to it with some doubt by Theobald.

Leptosomatomyia lateralis, Theo.

♂. Proboscis shorter than the abdomen, but not swollen at the tip. Eyes touching. Last two antennal segments together about half as long as the rest of the flagellum, and with longer pubescence, last longer than penultimate; basal flagellar segments with median whorls only, no short hairs at the tips, scarcely swollen in the middle. Flat scales of head reaching the middle line in front, surrounding the patch of narrow scales, but there is a row of narrow scales on the eye-margins at the sides, not shown in Theobald's diagram. The specimen is pinned from the side, and the pleural bristles are largely obscured, especially in the spiracular and post-spiracular areas; there are several pro-epimerals, and about five lower mesepimerals. The pro-epimera have broad white flat scales below and some narrow ones above. Hind tibiae very slightly longer than the front ones; first hind tarsal segment very slightly longer than the tibia; hind claws very minute; no pulvilli (?). Vein Sc ending just before the apex of Rs; Cell R_2 not at all narrowed apically; posterior cross-vein not unusually short.

Hypopygium: ninth tergite forming a narrow strip, scarcely divided in the middle, with short hairs. Side-pieces a little over twice aas long as their greatest breadth, outer face scaly, lower face with a patch of hair; on the upper side of the

inner face a rather large hairy median lobe, and on the lower side just before the middle two rather long spines, close together, placed on tubercles. Claspers rather stout, curved, grooved on the outer side, terminal claw stout and rather short. Tenth sternites strong, black, ending in a single sharp point. Parameres very small; mesosome of two lobes, each apparently with a single small subapical tooth.

I consider that the available evidence suggests that *L. lateralis* should be placed in *Aëdes*, perhaps in a distinct subgenus.

I.—The Culicid Fauna of New Caledonia.

The first record of the occurrence of Culicidae in New Caledonia is that of Laveran (C.R. Soc. Biol., lii, p. 568, 1901), who describes *Culex kermorganti*, and mentions the occurrence of other species, among which there were no *Anopheles*. Later, Theobald (Nova Caledonia, i, p. 164, 1913) records the occurrence of *Culex jepsoni*, Theo., *C. nocturnus*, Theo., and *Chrysoconops acer*, Theo., and describes as new *Culex nocturnus* var. *niger*. So far as I am aware there are no other records of New Caledonian mosquitos.

A small collection was made on the island by the late Paul D. Montague in 1914, and the specimens comprising it have recently been presented to the British Museum. Five species were included, only one of them being among those previously recorded, two others being the common domestic species *Culex fatigans* and *Aëdes argenteus*.

With the necessary changes in nomenclature, the list of the Culicid fauna of New Caledonia as now known may be given as follows :—

Mucidus kermorganti (Laveran).
Aëdes (*Stegomyia*) *argenteus*, Poiret.
Aëdes (*Ochlerotatus*) *vigilax* (Skuse).
Aëdes (*Finlaya*) *notoscriptus* (Skuse).
Taeniorhynchus (*Coquillettidia*) *brevicellulus*, Theo.
Culex sitiens, Wied.
Culex fatigans, Wied.
Rachionotomyia caledonica, sp. n.

Mucidus kermorganti (Laveran).

Culex kermorganti, Laveran, C.R. Soc. Biol., liii, p. 568 (1901).

I am indebted to Mr. E. Séguy, of the Paris Museum, for enabling me to examine two female specimens of this species, and for presenting one of them to the British Museum. This latter specimen is from Calama, 1869 (*Delacour*). The scales of the abdomen and legs are rather small and all closely appressed, so that at first sight the species appears very distinct from its congeners. Apart from this striking difference, however, the species is extremely similar to *M. alternans* (Westw.), the structural characters and colour markings being the same. An analogous case is that of *Psorophora ciliata*, F., and *Ps. ctites*, Dyar, which differ in a similar manner.

Aëdes (Ochlerotatus) vigilax (Skuse).

Culex vigilax, Skuse, Proc. Linn. Soc. N.S.W. (2) iii, p. 1731 (1889).
Culex marinus, Theobald, Mon. Cul. i, p. 396 (1901).
Culex pseudovigilax, Theobald, Mon. Cul. iv, p. 382 (1907).
Culex annuliferus, Ludlow, J.N.Y. Ent. Soc., ii, p. 141 (1903).
Culex ludlowi, Blanchard, Moustiques, p. 630 (1905).
Culex noctornus, Theobald, Mon. Cul. iii, p. 159 (1903).
Culex nocturnus var. *niger*, Theobald, Nova Caledonia, i, p. 164 (1913).

Although I have seen males only from Queensland and the Philippines, I have no doubt that all the above names refer to one species. Since it appears to breed habitually in sea-water, it is not at all surprising that it should have attained a wide

distribution. Several specimens were collected by Mr. Montague, which agree well with Queensland examples. I have also seen the species from Formosa (Anping, *Sauter*) and Siam (Patani Cape, *Robinson* and *Annandale*).

Aëdes (Finlaya) notoscriptus (Skuse).

A single female was collected by Mr. Montague 15 miles inland on the Houailou River. I can see nothing to separate it from the common Australian species. *A. notoscriptus* is a widely distributed species, having been recorded from Australia and New Guinea, and quite recently from New Zealand by Mr. D. Miller. It is subject to considerable variation, especially in New Zealand, where the white thoracic lines are in some specimens entirely replaced by golden ; the last hind tarsal segment may be either white or black, or dark above and pale below.

Taeniorhynchus brevicellulus, Theo.

Recorded by Theobald (as *Chrysoconops acer*) from a single female in alcohol. The species is known to occur from Queensland to India, but apparently not in New Zealand, Walker's type of *Culex acer* being probably an abraded *C. fatigans*.

Culex sitiens, Wied.

I have not seen New Caledonian examples of this species, but it is most probably the species which Theobald has recorded as *C. jepsoni* ; the type of *C. jepsoni* is a female from Fiji, and is almost certainly *C. sitiens*, but another similar species also occurs in Fiji, and it is possible that this may be the New Caledonian species, or both may very likely occur. *C. sitiens* is a common salt-marsh species extending from Queensland to Somaliland.

Rachionotomyia caledonica, sp. n.

Head mostly black-scaled ; a narrow but conspicuous white margin to the eyes. Vertical and orbital bristles long, black, the former not very widely separated from the latter. Clypeus brown, bare. Proboscis very long and slender, considerably longer than the long front femora, entirely dark-scaled. Palpi dark-scaled, in ♂ about three-quarters as long as the proboscis, very slender and practically hairless, last two segments about equal in length ; in ♀ nearly twice as long as the clypeus. Antennae about three-fifths as long as the proboscis ; in ♂ strongly plumose, the last two segments less than half as long as the remainder ; in ♀ with very long verticils except on the last few segments. *Thorax* : integument of mesonotum rather light brown ; considerably denuded, but the remaining vestiture shows that it was densely covered with small, dark brown, narrow curved scales, in the middle, the anterior and lateral margins with longer, very narrow and slightly curved white scales, and a few broad flat ones in front of the wing-roots. Scutellum with small flat dark brown scales. About five pairs of dorso-central bristles. Pleural integument with two longitudinal dark brown unscaled stripes, the equally broad pale stripe between them clothed with flat white scales. Prothoracic lobes dark brown, clothed with flat white scales. Pro-epimera dark brown, nearly bare (perhaps denuded). One pro-epimeral bristle ; two or three spiraculars ; one small upper sternopleural. Postnotum light brown, bare. *Abdomen* : first tergite with dark brown scales, second and third with dark brown scales and narrow apical white bands of even width (remainder of abdomen missing). *Legs* long and slender, dark brown, unmarked except that the femora are light on their undersides towards the base. Hind tibiae a little shorter than the others ; first hind tarsal segment about one-fourth longer than the tibia. Claws on front and mid legs of ♂ unequal, the larger claw on the front legs with a small tooth about the middle ; remaining claws all simple ; two very small ones on hind legs. *Wings* with dark brown scales, the outstanding ones linear, not very numerous. Upper fork-cell about twice as long as its stem, its base slightly nearer the base of the wing than that of the lower. Cross-veins separated by twice the length of the posterior. Wing-length, 3 mm. (♂)–3·5 mm. (♀).

Cotypes, 1 ♂, 1 ♀, Houailou, 31.vii. and 1.viii.1914 ; bred from pitcher of *Nepenthes*.

I have referred this form to *Rachionotomyia* rather than to *Rachisoura* or *Mimeteomyia* on account of the long slender proboscis and the breeding habits. The long ♂ palpi, however, are unusual in this genus and are not found in any Oriental species. The presence of well-marked dorso-central bristles is noteworthy, since these bristles are otherwise present only in the *Colonemyia* group of *Rachionotomyia* and not in *Rachisoura* or *Mimeteomyia*. The new species, however, lacks the conspicuous ornamentation of the *Colonemyia* group.

J.—Errors and Omissions in my Paper on the Palaearctic Mosquitos.*

Immediately before my paper appeared in print, descriptions were published by Mr. S. Yamada of ten new species of *Aëdes* from Japan.† Three of these were recorded only from Formosa, but the following should be added to our list of Palaearctic species :—

Aëdes galloisi, Yam.	Subgenus *Stegomyia*,	near *S. albopictus*, Skuse.
,, *flavopictus*, Yam.	,,	,,	,,
,, *chemulpoensis*, Yam.	,,	,,	,, *S. fraseri*, Theo.
,, *watasei*, Yam.	,,	*Finlaya*,	,, *F. melanopterus*, Giles.
,, *seoulensis*, Yam.	,,	,,	,, *F. gubernatoris*, Giles.
,, *omurensis*, Yam.	,,	*Ecculex*, synonymous with *E. alboscutellatus*, Theo.	
,, *esoensis*, Yam.	,,	*Aëdes*, near *A. cinereus*, Mg.	

Mr. Yamada has kindly shown me his types, and I can confirm the distinctness of all the species (except *A. omurensis*) from previously described forms. All except *A. esoensis* are of Oriental affinities.

The following further corrections and additions should be noted :—

Page 263. In making my acknowledgments I unfortunately omitted the names of several correspondents who had assisted me with specimens. These were : Dr. M. Langeron, Paris ; Mr. G. Boag, Aguilas, S. Spain ; Mr. A. Tonnoir, Brussels Museum ; Mr. M. P. Riedel, Frankfurt a. M. ; Major S. R. Christophers, Kasauli, India.

Page 264. The researches of Mr. Yamada indicate that the boundary between the Oriental and Palaearctic types of mosquito fauna in Japan is between the islands of Honshu and Hokkaido, or roughly the 40th parallel of latitude. The mountains of northern Honshu also seen to have the Palaearctic type of fauna.

Page 265. *Aëdes salinellus* should have been mentioned in the list, with an American representative in *A. impiger* (*decticus*).

Page 272. Mr. Stanley B. Freeborn has called my attention to a paper (Journal of Parasitology, vii, pp. 67–79, 1921) in which he and Prof. Herms have described the eggs of *Anopheles occidentalis* (under the name *A. quadrimaculatus*). These resemble those of *A. maculipennis* except that the average number of divisions in the lateral floats is smaller (12 instead of about 16). This confirms the status of *A. occidentalis* as at most a variety of *A. maculipennis*.

Page 279. Dr. M. Langeron (Archives de l'Inst. Pasteur de l'Afrique du Nord, i, pp. 347–382, 1921) has briefly described the larva of *A. sergenti*. It resembles *A. culicifacies* and *A. funestus* in having palmate hairs on each of the first seven abdominal segments and on the thorax. He does not mention the abdominal scuta, the size of which would decide to which of these species *A. sergenti* is more nearly related.

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* Bull. Ent. Res. xii, pp. 263–351, 1921.
† Annot. Zool. Japon. x, pp. 45–81, 1921.

Page 283. Dr. Langeron, in the paper just cited, records larvae of *Uranotaenia unguiculata* from Southern Tunis.

Page 287. A brief description of the larva of *Theobaldia alaskaensis* has been given by Dyar (Insec. Inscit. vii, p. 33, 1919). It differs from *T. annulata* in the siphonal index (2·5 instead of 3–3·5).

Page 303. I am indebted to Lt.-Col. W. P. MacArthur for two larvae and a perfect female of *A. zammitti*. The larvae are obviously distinct from those of *A. mariae*, from which they differ in the points I have emphasised. The white stripes on the thorax of the female are very distinct, and are connected by small white areas with the lateral margins. The abdomen has very distinct traces of a median longitudinal dorsal stripe, thus approaching rather closely to *A. caspius* in appearance, though differing in the pure white basal segmental bands.

Page 304. The Parisian specimens of *A. pulchritarsis* have been described by Séguy as *A. berlandi* (Bull. Soc. Ent. France, 1921, p. 192). I consider the form to be at most a variety of *A. pulchritarsis*.

Page 310. Dr. H. G. Dyar, who has compared numerous specimens of adults and larvae, is of opinion that *A. rostochiensis* is specifically distinct from *A. cataphylla*.

Page 314. The absence of a spine on the basal lobe of the male side-piece will not distinguish *A. parvulus* from *A. alpinus*. It is really absent or extremely weak in *A. alpinus* also.

Page 319. The name *Culex wahlgreni*, Theobald, should be added to the synonyms of *Aëdes geniculatus*. It was proposed (Mon. Cul. v, p. 396, 1910) as a substitute for *C. fusculus*, Wahlgren (Ark. Zool., 1905). Wahlgren, however, did not introduce the name *fusculus* but merely remarked on Zetterstedt's types.

Page 325. According to Mr. Yamada it is doubtful if *A. argenteus* occurs in Japan proper. There may have been some mistake in Theobald's record ; the specimen on which it was founded is not now in the British Museum.

Page 330. Under heading 16 in the key the names of the species were accidentally reversed. *C. vishnui* is the species with the long tooth on the mesosome.

Page 336. The name of Yamada's species is incorrectly spelt. It should be *C. hayashii*. The correction should be made also in other places where the name is used.

Page 342. I feel almost certain that Ingram and Macfie have figured an immature larva of *C. quasigelidus* by mistake for the larva of *C. univittatus*, and fully anticipate that breeding experiments will eventually prove the identity of *C. perexiguus* and *C. univittatus*.